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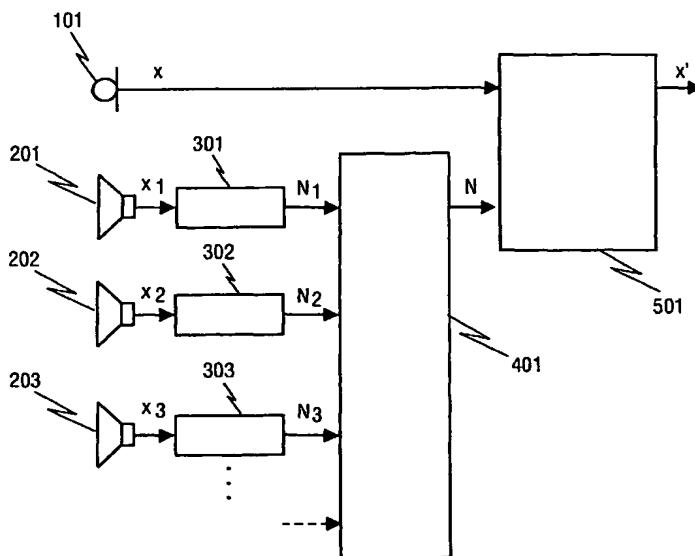
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[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR REDUCING AN INTERFERENCE NOISE SIGNAL FRACTION IN A MICROPHONE SIGNAL



(57) Abstract: The invention discloses a method of reducing an interference noise signal fraction in a microphone signal, which method is based on estimating the interference noise signal fraction from a virtually pure interference noise signal and does not require any additional microphones. It is an essential feature of the method according to the invention that the signal which is used as a basis for estimating the interference noise signal fraction in the microphone signal of interest is received by means of one or more inversely operated loudspeakers. There is no need to install further microphones, particularly in situations where there are already one or more loudspeakers as components of an audio system. Such a situation arises for example in any motor vehicle fitted with an audio system.

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A. CLASSIFICATION OF SUBJECT MATTER

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B. FIELDS SEARCHED

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Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC, COMPENDEX, IBM-TDB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6 317 501 B1 (MATSUO NAOSHI) 13 November 2001 (2001-11-13) figure 8 -----	1-9
Y	DE 43 03 921 A (BAYERISCHE MOTOREN WERKE AG) 11 August 1994 (1994-08-11) column 1, line 34 - line 45 column 1, line 56 - line 58 -----	1-9
A	US 4 536 887 A (KANEDA YUTAKA ET AL) 20 August 1985 (1985-08-20) column 3, line 59 - line 66 column 7, line 39 - line 44 ----- -/-	3

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Patent family members are listed in annex.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2001/005822 A1 (SAKAGUCHI JUNICHI ET AL) 28 June 2001 (2001-06-28) paragraph '0002! paragraph '0006! – paragraph '0007! figure 11 -----	5
A	WO 94/11953 A (NOISE BUSTER TECHNOLOGY ; CLIFTON SCOTT (AU); BREMNER PAUL (AU); TODTE) 26 May 1994 (1994-05-26) figure 2 -----	1-9
A	EP 0 898 441 A (BOSCH GMBH ROBERT) 24 February 1999 (1999-02-24) paragraph '0004! -----	1-9

INTERNATIONAL SEARCH REPORT

International Application No PCT/IB2004/001025	
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Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 6317501	B1	13-11-2001	JP	3541339 B2	07-07-2004
			JP	11018194 A	22-01-1999
			US	2002041693 A1	11-04-2002
			US	2002080980 A1	27-06-2002
			US	2002106092 A1	08-08-2002
DE 4303921	A	11-08-1994	DE	4303921 A1	11-08-1994
US 4536887	A	20-08-1985	JP	1677062 C	26-06-1992
			JP	3042760 B	28-06-1991
			JP	60041393 A	05-03-1985
			JP	1026598 B	24-05-1989
			JP	1543405 C	15-02-1990
			JP	59072295 A	24-04-1984
			CA	1208758 A1	29-07-1986
			NL	8303589 A ,B,	16-05-1984
US 2001005822	A1	28-06-2001	JP	2001175298 A	29-06-2001
WO 9411953	A	26-05-1994	AU	6295294 A	08-06-1994
			WO	9411953 A2	26-05-1994
EP 0898441	A	24-02-1999	DE	19735450 C1	11-03-1999
			EP	0898441 A2	24-02-1999
			JP	11122692 A	30-04-1999